

## Stage 1 Desired Results

### ESTABLISHED GOALS (CCSS)

**N.Q.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.  
**N.Q.2** Define appropriate quantities for the purpose of descriptive modeling.  
**N.Q.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities

**A.SSE.1** Interpret expressions that represent a quantity in terms of its context.★  
 a. Interpret parts of an expression, such as terms, factors, and coefficients.  
 b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret  $P(1+r)^n$  as the product of  $P$  and a factor not depending on  $P$ .

**A.CED.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

**A.CED.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

**A.CED.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

**A.CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law  $V = IR$  to highlight resistance  $R$ .

**A.REI.1** Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

**A.REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

### Transfer

*Students will be able to independently use their learning to... understand quantities and the relationships between them.*

### Meaning

#### UNDERSTANDINGS

*Students will understand that...*

- *algebra uses symbols to represent quantities that are unknown or that vary*
- *representing mathematical phrases and real-world relationships is achieved by using symbols and operations*
- *simplifying an expression, you perform operations in the correct order*
- *relationships that are always true for real numbers are called properties, which are rules used to rewrite and compare expressions*
- *rules for multiplying real numbers are related to the properties of real numbers and the definitions of operations*
- *rules for dividing real numbers are related to the rules of multiplying real numbers*
- *the distributive property can be used to simplify the product of a number and a sum or difference*
- *simplifying an algebraic expression by combining the parts of the expression that are alike*
- *equations can represent the relationship between two quantities that have the same value*
- *sometimes the value of one quantity can be found if you know the value of another. You can represent the relationship between the quantities in different ways, including tables, equations and graphs*
- *equivalent equations have the same solution*
- *finding the solution of a one-step, two-step or multi-step equations using the properties of equality, inverse operations and properties of real numbers gives you a simpler equivalent equation*
- *the use of the properties repeatedly will isolate the variable*
- *working with literal equations, use the methods of isolating any particular variable*
- *ratios and rates are related*

#### ESSENTIAL QUESTIONS:

*How can you represent quantities, patterns and relationships?*

*How are properties related to algebra?*

*Can equations that appear to be different be equivalent?*

*How can you solve equations?*

*Can inequalities that appear to be different be equivalent?*

*How can you solve inequalities?*

- if two ratios are equal and a quantity in one of the ratios is unknown, write and solve a proportion to find the unknown quantity
- use of proportions to find missing side lengths in similar figures
- solve percent using either proportions or the percent equation
- find percent change given the original amount and how much it has changed
- use percents to compare estimated or measured values to actual or exact values
- inequality is a mathematical sentence that uses and inequality symbol to compare the values of two expressions
- properties of equalities can be used to solve inequalities
- finding the solution of a one-step, two-step or multi-step equations using the properties of equality, inverse operations and properties of real numbers gives you a simpler equivalent inequalities
- sets are a basis of mathematical language
- compound inequalities can have solutions that overlap or are combined
- solving an absolute value equations requires isolating the absolute value, then writing the equivalent pair of linear equations or inequalities

### Acquisition

#### Students will know...

- ✓ difference between algebraic and numerical
- ✓ difference between expressions and equations
- ✓ properties of real numbers
- ✓ inverse property of addition
- ✓ inverse property of multiplication
- ✓ distributive property
- ✓ addition and subtraction properties of equality
- ✓ multiplication and division properties of equality
- ✓ concept summary of solving equations
- ✓ difference between ratios and proportions
- ✓ cross products property of proportions
- ✓ percent proportion
- ✓ percent change

#### Students will be skilled at...

- ✓ Reason quantitatively and use units to solve problems
- ✓ Interpret the structure of expressions
- ✓ Create equations that describe numbers or relationships
- ✓ Understand solving equations as a process of reasoning and explain the reasoning
- ✓ Solve equations and inequalities in one variable
- ✓ analyzing and explaining the process of solving an equation
- ✓ developing fluency writing, interpreting, and translating between various forms of linear equations and inequalities, and using them to solve problems
- ✓ applying related solution techniques and the laws of exponents to the creation and solution of simple exponential equations.

	<ul style="list-style-type: none"> <li>✓ <i>addition &amp; subtraction property of inequality</i></li> <li>✓ <i>multiplication &amp; division property of inequality</i></li> </ul>	<ul style="list-style-type: none"> <li>✓ mastering solutions of linear equations                             <ul style="list-style-type: none"> <li>▪ one-step</li> <li>▪ two-step</li> <li>▪ mult-step</li> <li>▪ variables on both sides</li> </ul> </li> <li>✓ use of exponents</li> <li>✓ the process of deductive reasoning and counterexamples</li> <li>✓ modeling using algebra tiles</li> <li>✓ rewriting and using literal equations and formulas</li> <li>✓ converting units and rate</li> <li>✓ solving percent problems</li> <li>✓ writing sets if different ways</li> <li>✓ solving absolute value equations &amp; inequalities</li> </ul>
--	---	---

**Stage 2 Evidence**

Evaluative Criteria	Assessment Evidence				
<b>PERFORMANCE TASKS</b>	<b>CURRICULUM EMBEDDED PERFORMANCE ASSESSMENT (PERFORMANCE TASKS):</b> <ul style="list-style-type: none"> <li>• Solve</li> <li>• Use a table to complete each part</li> <li>• Solve. Show work and explain you steps</li> <li>• Represent an equation in many ways</li> <li>• Solve an equation by two different methods</li> <li>• Show that the ratio of two quantities are equal</li> </ul>				
	<b>OTHER EVIDENCE:</b> <ul style="list-style-type: none"> <li>• Use of fundamental math facts</li> <li>• Use of technology</li> <li>• Use of properties</li> <li>•</li> </ul>				
<b>CLAIMS</b>	<b>CLAIM 1</b>	<b>CLAIM 2</b>	<b>CLAIM 3</b>	<b>CLAIM 4</b>	
<b>DEPTH OF KNOWLEDGE LEVELS</b>	<b>DOK 1</b>	<b>DOK2</b>	<b>DOK 3</b>	<b>DOK4</b>	
<b>ACHIEVEMENT LEVEL DESCRIPTORS</b>	<b>ALD 1</b>	<b>ALD 2</b>	<b>ALD 3</b>	<b>ALD 4</b>	

**Stage 3 Learning Plan**

*Summary of Key Learning Events and Instruction*

Lesson 1a	


Draft